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Ruth Montalvo

/August 6, 1999
Date

JCS11 U.S. PTO
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08/06/99

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Att. Docket No. : Drago-P86-RE
Applicant : Marcello TONCELLI
Reissue of U.S. Patent No.: 5,670,007
Granted : September 23, 1997
Filed : Simultaneously herewith
For : PROCESS FOR THE PRODUCTION OF
REINFORCED SLABS OF STONE
MATERIAL

Assistant Commissioner of Patents
Washington, D. C. 20231

REQUEST FOR FILING REISSUE APPLICATION

Sir:

This is a request for filing a reissue application under 37 C.F.R. § 1.171 of U.S. Patent 5,670,007 granted September 23, 1997 for **PROCESS FOR THE PRODUCTION OF REINFORCED SLABS OF STONE MATERIAL**.

TITLE REPORT

It is respectfully requested that a title report be placed into the file, and any fee can be charged to the Deposit Order Account 13-0025.

Enclosed herewith are:

1. A copy of the entire specification, claims and abstract of the original patent which includes the additions which have been underlined and the deletions which have been bracketed.
2. A Letter to the Commissioner which points out the amendments being made.
3. The executed declaration and power of attorney.

4. The fees have been calculated as follows:

Reissue filing fee based on large entity status	\$ 760.00
Reissue independent claims over original patent	0
Reissue claims in excess of 20 and over original patent (18)	\$ 324.00
TOTAL:	\$ 1,084.00

Applicant for reissue tenders the surrender of the original U.S. Letters Patent 5,670,007 upon grant of this application.

The Commissioner is hereby authorized to charge any fees which may be required, or credit any overpayment to Deposit Account No. 13-0025. A duplicate copy of this sheet is enclosed.

Please address all future communications to:

J. Harold Nissen, Esq.
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261 Madison Avenue
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Respectfully submitted,

McAULAY NISSEN GOLDBERG
KIEL & HAND, LLP

Date 8/6/99

By: J. Harold Nissen
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For	:	PROCESS FOR THE PRODUCTION OF REINFORCED SLABS OF STONE MATERIAL

Assistant Commissioner of Patents
Washington, D. C. 20231

LETTER TO THE COMMISSIONER

Sir:

This reissue application differs from the above-identified U.S. Patent in that the patent has been amended as follows:

IN THE CLAIMS:

The following new Claims 21 - 38 have been added:

-- 21. A process for producing a reinforced slab of products made of stone material, having a reinforcement which includes a hardened resin combined with a rear face of the slab, comprising:

providing a slab of stone material having a rear substantially smooth face,

providing a layer of non-twisted linear glass reinforcing elements applied to

the said rear face;

coating the non-twisted linear glass reinforcing elements with a coating of a

resin to form a reinforcement having a percentage ratio by weight of resin to the non-twisted linear reinforcing elements of at most 50:50 and hardening of the resin.

22. The process according to claim 21, wherein said layer of non-twisted linear glass elements consists of glass strands.

23. The process according to claim 22, wherein the percentage weight ratio of resin to glass-strands is 33:66, and are in the form of a matting or bundles.

24. The process according to claim 21, wherein said slabs of stone material have a thickness no greater than 10 mm.

25. The process according to claim 24, wherein said slabs of stone material have a thickness between 6 to 8 mm.

26. The process according to claim 21, including inserting further linear reinforcing elements between said reinforcement layer and the rear face of the slab.

27. The process according to claim 26, wherein said further linear reinforcing elements are made of metal, and the metal is steel.

28. The process according to claim 26, including housing said further linear reinforcing elements in grooves or recesses formed in said rear face of the slab.

29. The process according to claim 27, wherein said grooves or recesses form a grid.

30. The process according to claim 27, including inserting, as said further linear reinforcing elements, laid down glass fiber yams between said reinforcement and the rear face of the slab linear and sealing the laid down glass fiber yams within said grooves or recesses.

31. The process according to claim 30, wherein said further linear reinforcing elements include rods or bars of extruded fibers of glass and resin.

32. The process according to claim 31, wherein said linear rods or bars have a diameter of 2 to 2.5 mm.

33. The process according to claim 31, wherein said rods or bars comprise

68% glass and 32% resin, the percentages being expressed by weight.

34. The process according to claim 21, wherein said ratio by weight between the resin and the glass reinforcing elements is 45:55.

35. The process according to claim 21, including hardening of the resin with a catalyst and/or the application of heat.

36. The process according to claim 27, wherein said further linear reinforcing members comprise four 4800 TEX (19.6 g/m) glass threads laid down within grooves formed in the slabs having a dimension of 3 to 4 mm. in depth.

37. The process according to claim 36, wherein said glass threads are non-twisted and have a linear dilatation coefficient of $8 \text{ to } 9 \times 10^{-6}$.

38. The process according to claim 26, wherein said glass threads are cylindrical and have a circular cross-section with a diameter between 2 to 2.5 mm., a linear dilatation coefficient of 7.5×10^{-6} and a glass content of 68 percent and resin content of 32 percent by weight. --

REMARKS:

Additional Claims were added, and while the Reissue Declaration does indicate the reasons for filing the Reissue Application, certain points should be noted.

Claims 1 to 20 of the original patent are being retained. The amended claims in this reissue application do not require that the rear substantially smooth face be free of grooves or recess. New claim 21 was broadened to include this feature. Also, reference is made to column 4, lines 10 to 28, which clearly sets forth experimental results comparing mechanical properties of a granite slab reinforced according to the invention and disclosure as originally filed in comparison with a granite slab without any or free of any rear reinforcement. Therefore, new claim 21 was also broadened to exclude the inclusion of a reinforcing layer between the coated non-twisted linear reinforcing elements and the rear face of the slab of stone material. Clearly, it is my opinion that my

invention as disclosed entitles me to the subject matter as claimed in claim 1, and claim 21.

The reissue claims are submitted as being for the same invention as the invention disclosed in the original patent. It is further submitted that the new Claims 21 to 37 are not directed to subject matter which has been previously canceled. The Claims 21 to 37 are considered to be a broadening of the Claims as originally filed and this application is being filed within the two year limit for filing applications for a broadening reissue.

The background to this invention is that in the granted U.S. Patent No. 5,670,007, reference is made to a process of producing reinforced slabs which only require the features in new claim 21.

Considering column 3, lines 8, it is not essential that the rear smooth face be free of grooves or recess, therefore this is omitted and the insertion of the reinforced layer is also omitted. Reference is also made to column 2, lines 60 to 67 of the patent, and to column 4, lines 10 to 28 of the patent.

Claim 22 is similar to claim 2 of my patent but is broadened because it now depends from new claim 21.

Claim 23 is a new claim that was added, dependent on claim 22 which refers to glass strands and the percentage ratio in claim 4 of my patent, and the glass strands can be in the form of a matting or bundles.

Claim 24 tracks claim 5 of the patent.

Claim 25 follows claim 6 of the patent.

Claim 26 adds the feature of inserting further linear reinforcing elements, and this is a feature which was removed from claim 1 to arrive at claim 21.

Claim 27 is based on claim 7 of the patent.

Claim 28 calls for grooves or recesses formed in the rear face and adds reinforcing elements as being housed in the grooves or recesses, and claim 8 of the patent is a basis for this claim.

Claim 29 is based on claim 9 of the patent.

Claim 30 substantially follows claim 10 of the patent.

Claims 31 to 33 generally follow claims 11 to 13 of the patent,
respectively.

Claim 34 tracks claim 14 of the patent, but has some slight change in
rendition of the ratio.

Claim 35 is somewhat similar to claim 16 of the patent.

Claim 36 is based on claim 17 of the patent.

Claim 37 is based on claim 18 of the patent.

Accordingly, early and favorable consideration is respectfully solicited
together with the allowance of this Application.

Respectfully submitted,
McAULAY NISSEN GOLDBERG
KIEL & HAND, LLP

Date

August 16, 1999

By:

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**PROCESS FOR THE PRODUCTION OF
REINFORCED SLABS OF STONE
MATERIAL**

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention is concerned with a process for the production of reinforced slabs of stone material.

5 More particularly, the present invention relates to improved materials for covering floors and lining the external and internal parts of buildings, in particular based on natural stones such as marble and granite.

2. Description of the Prior Art

10 The use of these natural-stone materials for the above-mentioned purposes is so well-known that no further comment is required.

However, some problems and drawbacks, mainly linked to specific applications, have been and are partly still associated with their use.

15 Firstly, the thickness of the slabs obtained from processing of the blocks produced by quarry-mining has hitherto been limited, in the sense that they cannot be reduced to values or thicknesses of less than 10 mm, due to the fact that
20 slabs of a smaller thickness are unable to withstand the subsequent machining operations, such as sizing, smoothing, polishing, chamfering, etc.

Secondly, natural stones usually do not possess homogeneous physical properties, in particular as regards their
25 impact strength and flexural strength.

Obviously these drawbacks create even more problems as regards the manufacture and use of stone products of limited thickness (namely, products in the form of slabs, tiles, etc.).

30 Consequently, hitherto for most applications, the products have been of a considerable thickness if not more, resulting in problems associated with their weight and hence difficulties of transportation, handling and laying.

Furthermore, in the case of large-size panels intended for
35 the external facades of buildings, any breakage, due for example to gusts of wind, seismic tremors or even localized knocks, causes the detachment of fragments of a not insignificant size with their obvious dangers.

In recent years, much research has been carried out in
40 connection with the manufacture of thin products made of natural stone, in particular marble or granite, which do not have the aforementioned drawbacks and problems.

In this connection, a very important part was also played
45 by the increasingly widespread use of so-called suspended floors, namely floors supported at a certain height from the concrete layer forming the natural floor so as to form an easily accessible cavity housing all the components of internal installations for the electrical supply, telephone
50 connections and air-conditioning. This solution has proved to be particularly advantageous for commercial buildings and offices.

Furthermore, a specific goal, with which the efforts of
research technology have concentrated, but which hitherto
55 has never been achieved, has been that of providing products made of natural stone material with a thickness comparable to that of ceramic products, so as to allow the replacement of ceramic with granite or marble even where the flooring is replaced, without the need for onerous adaptation work (such as dismantling of part of the thickness of the concrete
60 support layer, trimming of the bottom edges of the doors, etc.).

In solutions proposed and tried hitherto, attempts have been made to reinforce thin slabs of natural-stone material by applying to their rear face (namely, the reverse face, or rear face which is the surface normally intended to remain out of view or sight) reinforcing elements, in the form of metal or glass-fibre or plastic grids, which are fixed to the aforementioned rear surface of the slab by means of a synthetic resin, for example, an epoxy or polyester resin.

In Italian Patent Application No. TV92A000041 filed on 23 Mar. 1992 and its corresponding European Patent Application No. 93201852.6, filed on Jun. 25, 1993, in the name of the same Applicant, a solution of this type is proposed, by forming in the rear or reverse face of the slab of natural-stone material, a regular grid formed by grooves or recesses having a depth less than the thickness of the starting slab and by anchoring therein a preferably metal reticular element by means of a binder, also preferably consisting of a synthetic resin, which fills the cavities and envelopes the metal elements forming the grid.

In turn, according to a subsequent patent application again filed in the name of the same Applicant and inventor (Italian Patent Application No. PD93A000099, filed on 6 May 1993, also filed as European Patent Application No. 94106949.4 filed May 4, 1994), the rear face of the slabs have recesses, and embedded in the recesses is preferably flaming the slabs or the tiles which will be formed from the latter, a reinforcing element consisting of a synthetic resin, so as to define in the edges of each slab or tile a thickness of plastic material applied so as to reinforce the tile or slab precisely in the region of the parts which are most likely to be subject to deterioration or damage during subsequent machining operations. Furthermore, these inserts of plastic material also have the property of favoring cutting of the slabs into tiles or slabs of smaller dimensions with a rational use of the available initial slab area.

Finally, in Italian patent Application No. MI93A001462 of 6 Jul. 1993 also in the name of the inventor of this application, there is described a process for manufacturing thin slabs of stone material reinforced on the rear face by means of a metal reticular element, for example a meshwork made of stretched metal or steel sheet, fixed to the aforementioned rear face by means of a bonding resin such as an epoxy resin.

Tests carried out heretofore have shown, however, that the thin slabs obtained using the aforementioned technologies, while being satisfactory from the point of view of the desired mechanical strength together with the primary objective of a limited thickness, still have a drawback arising from the difference in the thermal coefficient of expansion between the stone material and the resin used as a bonding agent.

This is obviously a drawback which was not foreseen since it was difficult to imagine that a slab of granite could become warped as a result of a difference between the thermal expansion of the granite itself and the thermal expansion of the layer of resin adhering to the rear face of the granite.

SUMMARY OF THE INVENTION

It has now been discovered, this discovery representing the main aspect of the present invention, that the aforementioned problem can be eliminated if the bonding resin is used to impregnate a plurality of glass fibres in the form of non-twisted strands with a percentage ratio of glass strands to resin of at most 50:50, and preferably with a prevalence of glass strands compared to the resin (for example 55% glass strands and 45% percent resin).

DESCRIPTION OF THE PREFERRED EMBODIMENTS

In the preferred embodiment of the present invention the glass-fibre strands are used in the form of matting.

In the applications of the present invention two main situations are contemplated, namely:

- 5 a) Production of reinforced thin slabs, with a thickness of less than 10 mm and preferably equivalent to 6-8 mm, in which the matting of non-twisted glass strands is impregnated with the bonding resin and applied to the rear face of the natural-stone slab, followed by hardening of the resin, for example by the action of a catalyst and/or heat.

When a particularly marked reinforcing effect is required, instead of a single mat of glass strands, two or more mats may be used, each impregnated with the bonding resin.

- 15 It is moreover possible and envisaged to insert between the impregnated glass-strand matting and the rear face of the slab of stone material a separate reinforcing layer, for example consisting of steel in the form of a meshwork or stretched metal sheet, operating in the manner described in the already mentioned Italian Patent Application No. MI93A001462.

In addition the bonding resin may be used to fix to the rear face of the slab of stone material a layer of fire-resistant or noise-insulating material, as envisaged in the last mentioned patent application.

- 25 b) Production of slabs of stone material for use outside of buildings, both as flooring and as wall lining materials.

In this case, the solution illustrated and described in the aforementioned Italian Patent Application No. TV92A000041 is modified in the sense that, in addition to the conventional reinforcement consisting of linear elements or of a grid made of metal, in particular steel, in the grooves formed in the rear face of the slab of stone material, use is made of non-twisted strands of glass-fibre which are impregnated with the bonding resin in the proportions indicated above, preferably so as to envelop the linear metal reinforcing elements, anchoring them inside the grooves themselves.

In this case, the resin used to envelop the linear metal reinforcing elements may contain a mineral filler with a low thermal expansion coefficient, such as silica, for example, in a quantity of up to 70% by weight with respect to the resin. Alternatively, instead of the linear metal reinforcing members seated within the grooves and forming a grid use can be made of laid down glass fiber yarns, consisting of four 4800 TEX (19.6 g/m) threads laid down within the groove having a depth of 3 to 4 mm.; the glass/resin ratio remains unchanged and the linear dilatation coefficient of this material is of $8 \text{ to } 9 \times 10^{-6}$, whereby it is consistent with the stone material. Another possible alternative is represented by circular cross-section reinforcing elements (rods) of extended fiber of glass and resin (68% glass, 32% resin by weight) of a diameter of 2-2.5 mm. with a linear dilatation coefficient of 7.5×10^{-6} . These rods having a circular cross-section can be substituted or replaced by bars having a rectangular cross section.

In the preferred embodiment of the invention, in both cases the percentage of resin used with respect to the non-twisted strands of glass, both as matting and as bundles of strands, is equivalent to 33% by weight with respect to the weight of glass strands; in the case of a thin slab reinforced with two mats there will be 1600 g/m² of glass-strand component and 800 grams per square meter of resin.

Among the resins which can be used in the present invention, epoxy resins of the type bisphenol A or bisphenol

A/C are preferred, while as a hardener a polyamine or a polyamide compound of the well-known type is used.

As a result of experimental tests performed in the laboratory on thin slabs of granite reinforced with two mats of non-twisted glass strands impregnated with 33% by weight of epoxy resin, it has been possible to ascertain firstly that the linear expansion coefficient of the mat+resin combination is between 15 and 30×10^{-6} per $^{\circ}\text{C}$., i.e. very close to that of granite.

The mechanical characteristics of the slabs thus obtained also proved to be excellent, as can be seen from the following table which shows the corresponding values for non-reinforced granite:

	Granite slab (thickness 8 mm)	Granite slab reinforced with 2 mats (thickness 8 mm)
Flexural strength	150 kg/cm ²	1950 kg/cm ²
Impact strength (1 kg sphere)	material breaks when H = 20 cm	When H = 60-90 cm: imprint remains but material does not break When H < 60 cm: no effect, with no cracks or imprints
Concentrated loading test with 25 x 25 mm punch	With P = 150 kg and camber = 2.5 mm, tile breaks	With P = 600 kg and camber = 7 mm, granite disintegrates, but backing remains attached.

In the above description, reference has been made to the impregnation of non-twisted glass strands, preferably in the form of matting, but it is obvious that this must not be regarded as limiting since other materials may be used with similar results, such as, for example, carbon fibres.

Likewise, instead of preliminary impregnation of the glass strands, it is possible to carry out a process consisting in arranging the layer or mat of glass strands and then casting the resin so as to coat and impregnate the glass strands.

For further details regarding background for the process for manufacturing reinforced slabs which are both thin and have grooves containing the metal reinforcing elements, either linear or in the form of a meshwork, reference would be made to the Italian patent applications indicated above, the contents of which are to be regarded as an integral part of the present invention.

While there has been described what is considered to be the preferred embodiments of the invention, it will be obvious to those skilled in the art that various changes and modifications may be made therein without departing from the scope of the invention.

I claim:

1. A process for producing reinforced slabs of products made of stone material, having a reinforcement which includes a hardened resin combined with a rear face of the slab, comprising

- providing a slab of stone material having a rear substantially smooth face free of grooves or recess;
- providing non-twisted linear reinforcing elements;
- coating the non-twisted linear reinforcing elements with a coating of a resin to form a reinforcement having a percentage ratio by weight of resin to the non-twisted linear reinforcing elements of at most 50:50;
- inserting a reinforcing layer between the coated non-twisted linear reinforcing elements and the rear face of the slab of stone material; and
- hardening of the resin.

2. The process according to claim 1, wherein said non-twisted linear elements consist of strands of glass.

3. The process according to claim 2, wherein said glass strands are in the form of a matting.

4. The process according to claim 3, wherein the percentage weight ratio of the resin to the glass-strand matting is 33:66.

5. The process according to claim 1, wherein said slabs of stone material have a thickness no greater than 10 mm.

6. The process according to claim 5, wherein said slabs of stone material have a thickness between 6 to 8 mm.

7. The process according to claim 1, wherein the linear reinforcing elements are made of metal, and the metal is steel.

8. The process according to claim 1, wherein grooves or recesses are formed on said rear face of the slab and said linear reinforcing elements are housed in the grooves or recesses.

9. The process according to claim 8, wherein said grooves or recesses form a grid.

10. The process according to claim 8 including inserting laid down glass fiber yarns between said reinforcement and the rear face of the slab linear reinforcing elements and sealing the laid down glass fiber yarns within the grooves or recesses.

11. The process according to claim 10, wherein said linear reinforcing elements include rods or bars of extruded fibers of glass and resin.

12. The process according to claim 11, wherein said linear rods or bars have a diameter of 2 to 2.5 mm.

13. The process according to claim 11, wherein said rods or bars comprise 68% glass and 32% resin, the percentages being expressed by weight.

14. The process according to claim 1, wherein the linear reinforcing elements include the glass strands and resin having a ratio of 55:45 of the glass strands to the resin.

15. The process according to claim 1, wherein said slabs of stone material have a thickness between 6 to 8 mm.

16. The process according to claim 15, wherein hardening of the resin is performed by the step selected from the group consisting of adding a catalyst to the resin, application of heat to the resin, or combination of the addition of a catalyst and heat.

17. The process according to claim 1, wherein the linear reinforcing members comprise four 4800 TEX (19.6 g/m) glass threads laid down within grooves formed in the slabs having a dimension of 3 to 4 mm in depth.

18. The process according to claim 17, wherein the glass threads are non-twisted and have a linear dilatation coefficient of 8 to 9×10^{-6} .

19. The process according to claim 17, wherein the glass threads are cylindrical and have a circular cross-section with a diameter between 2 to 2.5 mm, a linear dilatation coefficient of 7.5×10^{-6} and a glass content of 68 percent and resin content of 32 percent by weight.

20. The process according to claim 1, including applying two mats of non-twisted glass strands impregnated with 33% by weight of an epoxy resin, to provide for a linear expansion coefficient of the mat and resin combination between 15 and 30×10^{-6} per $^{\circ}\text{C}$.

* * * * *

CLAIMS:

/21. A process for producing a reinforced slab of products made of stone material, having a reinforcement which includes a hardened resin combined with a rear face of the slab, comprising:

providing a slab of stone material having a rear substantially smooth face,
providing a layer of non-twisted linear glass reinforcing elements applied to the

5 said rear face;

coating the non-twisted linear glass reinforcing elements with a coating of a resin to form a reinforcement having a percentage ratio by weight of resin to the non-twisted linear reinforcing elements of at most 50:50 and hardening of the resin.

22. The process according to claim 21, wherein said layer of non-twisted linear glass elements consists of glass strands.

23. The process according to claim 22, wherein the percentage weight ratio of resin to glass-strands is 33:66, and are in the form of a matting or bundles.

24. The process according to claim 21, wherein said slabs of stone material have a thickness no greater than 10 mm.

25. The process according to claim 24, wherein said slabs of stone material have a thickness between 6 to 8 mm.

26. The process according to claim 21, including inserting further linear reinforcing elements between said reinforcement layer and the rear face of the slab.

27. The process according to claim 26, wherein said further linear reinforcing elements are made of metal, and the metal is steel.

28. The process according to claim 26, including housing said further linear reinforcing elements in grooves or recesses formed in said rear face of the slab.

29. The process according to claim 27, wherein said grooves or recesses form a grid.

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August 6, 1999

30. The process according to claim 27, including inserting, as said further linear reinforcing elements, laid down glass fiber yams between said reinforcement and the rear face of the slab linear and sealing the laid down glass fiber yams within said grooves or recesses.

31. The process according to claim 30, wherein said further linear reinforcing elements include rods or bars of extruded fibers of glass and resin.

32. The process according to claim 31, wherein said linear rods or bars have a diameter of 2 to 2.5 mm.

33. The process according to claim 31, wherein said rods or bars comprise 68% glass and 32% resin, the percentages being expressed by weight.

34. The process according to claim 21, wherein said ratio by weight between the resin and the glass reinforcing elements is 45:55.

35. The process according to claim 21, including hardening of the resin with a catalyst and/or the application of heat.

36. The process according to claim 27, wherein said further linear reinforcing members comprise four 4800 TEX (19.6 g/m) glass threads laid down within grooves formed in the slabs having a dimension of 3 to 4 mm. in depth.

37. The process according to claim 36, wherein said glass threads are non-twisted and have a linear dilatation coefficient of $8 \text{ to } 9 \times 10^{-6}$.

38. The process according to claim 26, wherein said glass threads are cylindrical and have a circular cross-section with a diameter between 2 to 2.5 mm., a linear dilatation coefficient of 7.5×10^{-6} and a glass content of 68 percent and resin content of 32 percent by weight.

ABSTRACT

5 A process for manufacturing slabs of stone material such as marble or granite, reinforced with reinforcing elements in particular made of steel and fixed to a rear surface of the slabs by a bonding resin of the hardening type. The resin is used to impregnate non-twisted strands of glass, preferably in the form of matting, in a percentage weight ratio of glass strands to resin of at least 50:50, with a preference for a quantity by weight of glass strands greater than 50%.

DECLARATION FOR REISSUE PATENT APPLICATION

I, Marcello Toncelli declare that

My residence, post office and citizenship are the same as stated next to my name.

I verily believe that I am an original, first and sole inventor of the subject matter of the invention described and claimed in the US Letters Patent No. 5,670,007 entitled PROCESS FOR THE PRODUCTION and in the foregoing specification for which invention I solicit a reissue patent.

I do not believe that said invention was ever known or used in the United States of America before any invention thereof; that I verily believe the original patent to be partially inoperative or invalid by reasons of the patentee claiming more or less than the patentee had a right to claim in the patent and defective by reason that I claimed less than I have a right to claim in the patent, and specifically, on the basis that the claims are too narrow in that the invention is broad enough as disclosed to be directed to a process for producing reinforced slabs of the products made of stone material having a reinforcement which includes a hardened resin combined with a rear face of the slab, and language in the claim that the rear smooth face is free of grooves or recess. That is, the Claims of my U.S. Patent No. 5,670,007 require that the rear smooth face is free of grooves or recess, and it is now desired to remove the limitation and include a rear smooth face which can include grooves or recess. The claims also do not have to include a reinforcing layer between the coated non-twisted linear reinforcing linear reinforcing elements and the rear face of the slab of stone material, because this is considered to be too limiting.

Claims 1 to 20 of the original patent are being retained. The amended claims in this reissue application do not require that the rear substantially smooth face be free of grooves or recess. New claim 21 was broadened to include this feature. Also, reference is made to column 4, lines 10 to 28, which clearly sets forth experimental results comparing mechanical properties of a granite slab reinforced according to the invention and disclosure as originally filed in comparison with a granite slab without any or free of any rear reinforcement. Therefore, new claim 21 was also broadened to exclude the inclusion of a reinforcing layer between the coated non-twisted linear reinforcing elements and the rear face of the slab of stone material. Clearly, it is my opinion that my invention as disclosed entitles me to the subject matter as claimed in claim 1, and claim 21.

The Claims in this reissue application are for a matter for which the applicant verily believes he had the right to claim in the original patent. The addition of the feature about the insertion of a reinforcing layer was added during prosecution of the patent for formal or 112 reasons, and not to distinguish from any prior art.

Furthermore, the reissue claims are submitted as being for the same invention as the invention disclosed in the original patent. It is further submitted that the new Claims 21 to 37 are not directed to subject matter which has been previously canceled. The Claims 21 to 37 are considered to be a broadening of the Claims as originally filed and this application is being filed within the two year limit for filing applications for a broadening reissue.

The background to this invention is that in my granted US Patent No. 5,670,007 I, the applicant refer to a process of producing reinforced slabs which only require the features in new claim 21.

With this invention in mind as disclosed at column 3, lines 8 to 12 of US Letters Patent No. 5,670,007 and therefore instead of requiring that the rear smooth face be free of grooves or recess, this is omitted and the insertion of the reinforced layer is also omitted. Reference is also made to column 2, lines 60 to 67 of my patent, and to column 4, lines 10 to 28 of my patent.

I discussed this invention in detail with my Italian patent advisor and left to him the drafting of the actual application. The nature of my relationship with my patent advisor and my other activities at the time meant that the application was filed with some reference to me and what contact there was tended to be by telephone. I was basically concerned with the day to day operations of my factory and left the details of the claims to my patent advisor. My understanding of the patent was what was in the specification, and after the patent issued, I then discussed the various aspects of the protection.

Claim 22 is similar to claim 2 of my patent but is broadened because it now depends from new claim 21.

Claim 23 is a new claim that was added, dependent on claim 22 which refers to glass strands and the percentage ratio in claim 4 of my patent, and the glass strands can be in the form of a matting or bundles.

Claim 24 tracks claim 5 of my patent.

Claim 25 follows claim 6 of my patent.

Claim 26 adds the feature of inserting further linear reinforcing elements, and this is a feature which was removed from claim 1 to arrive at claim 21.

Claim 27 is based on claim 7 of the patent, but is broader in some aspects.

Claim 28 calls for grooves or recesses formed in the rear face and adds reinforcing elements as being housed in the grooves or recesses, and claim 8 of the patent is a basis for this claim.

Claim 29 is based on claim 9 of the patent, and is broader in some respects.

Claim 30 substantially follows claim 10 of the patent.

Claims 31 to 33 generally follow claims 11 to 13 of the patent, respectively.

Claim 34 tracks claim 14, but has some slight change in rendition of the ratio.

Claim 35 is somewhat similar to claim 16 of the patent.

Claim 36 is based on claim 17 of the patent.

Claim 37 is based on claim 18 of the patent.

There is a basis in the specification of the application as originally filed for a broadening of the claims.

I have reviewed Claims 1 to 20 of my original patent and have submitted claims 21 to 37 in this reissue application. Claim 21 is as original claim

1 of the patent except for removal of the limitation of the insertion of the reinforcing layer and the removal of free of grooves and recesses.

The errors as noted above in connection with the claims arose without any deceptive intention on my part, as clearly evidenced from the above statements, and a specific indication is set forth specifying the errors relied upon and how they arose and occurred.

The specification of the original US Patent No. 5,670,007 was filed as an application on August 11, 1995 claiming my Italian priority date. I have identified below any foreign application for patent or inventor's certificate having a filing date before that of the Application Serial No. 08/513,687 on which US Patent No. 5,670,007 was issued on September 23, 1997 listed below and have also identified below any foreign application for a patent or inventor's certificate having a filing date before that of the above-identified application for which priority is claimed.

THE PRIOR FOREIGN APPLICATION FOR WHICH PRIORITY
IS CLAIMED FOR APPLICATION SERIAL NO. 08/513,617 IS AS FOLLOWS:

TV94A000 102 Italy 25/08/1994

I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith and to act in accordance with instructions from Dragotti & Associates.

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I hereby state that I have reviewed and understand the contents of the reissue application including the claims, as amended and changed.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations § 1.56(a).

Referring now to the prior art, Toncelli, EPO 631 015, new claims 21 to 38 distinguish from Toncelli which provides for a slab 10 which includes as a unitary structure, a grid 12 into which a lattice work of metal bars or strips 18 are inserted. In effect, once the lattice work 18 is inserted, then the resin is impregnated. This is clearly distinguishable from claim 21. The present invention eliminates the grid 12 and the reinforcing members 16.

Bauer et al., U.S. Patent No. 4,973,526 and Bourke, U.S.

Patent No. 3,723,233 are not pertinent to the new claims 21 to 38, and note that marble lamina 4 is one part of a sandwich construction. Both Bauer et al and Bombe are concerned with a sandwich construction.

The two Kourtiles U.S. Patent Nos. 4,135,019 and 4,193,829 are not pertinent to the new claims.

I hereby declare that all statements made herein of my own knowledge are true, and that all statements made on information and belief are believed to be true; and further that statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and the such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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